The Marshall Star

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Director's Corner: NASA on the Square

You all know me as Patrick Scheuermann, Director of Marshall Space Flight Center and former Director of Stennis Space Center. But there's a Patrick Scheuermann you don't know: a young man who once only dreamed of working with the iconic men and women who first reached for the stars now gets to live that dream every day at this wonderful place we call NASA.

When I first drove through downtown Huntsville with my family after moving here in 2012, I knew I was driving on the same streets that space legend Dr.

*See **Director's Corner** on page 2*

Low Density Supersonic Decelerator Launch Test Flight Delayed Due to Weather

NASA did not conduct the flight test of the agency's Low-Density Supersonic Decelerator (LDSD) from the U.S. Navy's Pacific Missile Range in Kauai, Hawaii, during its designated launch period, which began June 3. Unfavorable weather, specifically wind conditions, prohibited NASA from conducting the test flight on any of the launch day opportunities that were scheduled with the range through June 14.

As NASA plans increasingly ambitious robotic missions to Mars, laying the groundwork for even more complex human science expeditions to come, accommodating extended stays for explorers on the Martian surface will require larger and heavier spacecraft.

The objective of the LDSD project is to test new technologies that can slow large, heavy equipment and landers entering the Martian atmosphere from supersonic speeds. Low density

*See **LDSD** on page 5*

NASA Turns Down the Volume on Rocket Noise through SLS Scale Model Acoustic Testing

By Megan Davidson

NASA engineers recently went on an auricle ride as a scale model of the Space Launch System (SLS), including solid rocket motors, was fired -- giving an "earful" of information about how low- and high-frequency sound waves will affect the rocket on the launch pad.

When completed, SLS will be capable of taking a crew and cargo on deep space missions, including to an asteroid and eventually to Mars.

"This test is unique because it's like going through the steps of a true launch, only on a much smaller scale," said Jeremy Kenny, acoustics engineer at NASA's Marshall Space Flight Center, where the test series is being conducted. "The noise the engines and boosters generate is so great that it can impact the rocket, and the crew, during liftoff. We have to ensure we have the proper suppression system to basically turn that noise down to a safe level."

*See **SLS Testing** on page 4*

Director's Corner

Continued from page 1

von Braun had ridden in the parade that celebrated the first landing on the moon. And later where he famously urged, "don't hang up your dancing slippers."

That was a lifetime ago, but on June 21, we have the opportunity to bring that dream, that vision, that inspiration to life again for a whole new generation—to introduce a new generation to their dancing slippers. After all, today's middle schoolers will be the ones to set foot on Mars, not you and me.

This community is still our largest fan base, and we can't do what we do without them. NASA on the Square gives us the most public of settings to remind everyone how important they are to us. Civic and business leaders regularly travel to Washington and Montgomery on our behalf. Average citizens convey their support to friends and family across the nation. Educators and students of all ages remain excited about flying in space and want to see more.

At the same time, we are more important to this community than many people realize. We provide thousands of jobs in and around Madison County and our economic activity generates thousands more. Our total impact in the area is $2.5 billion. That's above and beyond the technological advancements that provide better lives on Earth. On June 21 — on the Square in Downtown Huntsville — they will see up close how relevant we are in their daily lives.

NASA on the Square, hosted and made possible by Downtown Huntsville Inc., will serve as Marshall's 2014 Open House — we are taking it to the streets! While many people see us only as engineers and scientists, I see us as inventors and innovators. We're going to create a day to celebrate all the wonderful things we invent and improve.

We not only want to thank everyone; we want to excite them. This is going to be a fun, festive, and family-friendly day packed with interactive activities for all ages, Marshall musicians, and Marshall employee and contractor exhibits all around the square. In addition to a 30-foot inflatable SLS model and 1:1 Orion, we will demonstrate many exciting aspects of traveling to and through space; living and working in space; and understanding our world and beyond that many visitors have never known.

We cannot foresee all future uses of the technology we're developing. That will come. In part, it will come as a result of sharing our stories on June 21 with some young innovator in the crowd who is dreaming, as you and I did, of what neat things she or he can do in the future.

We anticipate thousands of all ages from across the Tennessee Valley coming to learn, see, and feel what you and I do every day.

In closing, I would like to express my great appreciation for everything you do for Marshall and NASA, and thank you for inspiring me. We do amazing things together.

Please join me and my family for this celebration. I'll be looking for you.

Patrick

Marshall's Payload Operations Center: The Place to Get Support for Mission Operations

By Jessica Eagan

It's been a year since the Payload Operations Integration Center (POIC) at NASA's Marshall Space Flight Center received a substantial upgrade. Over the last year, these upgrades have helped the team increase the amount of science completed on the International Space Station. In addition, the Backup Control Room for Mission Control has been recently upgraded to serve if needed during the hurricane season and a new capability will soon be added to support Space Exploration Technologies Corp. (SpaceX) during emergencies.

"The Marshall Center has a rich history in payload and mission operations at NASA," said Lewis Wooten, acting director for the Mission Operations Laboratory in Marshall's Engineering Directorate. "One of the things that we are very passionate about is the enablement of scientific research."

Wooten explained that over time, the mission operations team has significantly enhanced their technical expertise, made innovative advancements in our ground systems hardware, software and processes, and made prudent investments in facilities and infrastructure.

"All this has resulted in a cutting-edge capability for supporting operations critical to a variety of space missions," he said.

Walk into the room and you'll be greeted by a large, high-resolution video wall with 24, 55-inch screens that expands the ability to share information with the POIC ground controllers, such as live video, diagrams and photographs of studies being conducted on the space station. The wall instantly enables teams to view multiple data and video feeds related to one or more experiments. With more than 200 investigations operating aboard the station at any time, it is important to share information rapidly among the ground team members so they can relay information more efficiently back to the crew in space.

Since 2001, the operations center has worked with thousands of scientific investigators from around the world to perform scientific research in a variety of disciplines from astrophysics to human research to technology demonstrations to help future space explorers.

Johnson Space Center's flight control team works in the Backup Control Center in 2008 after evacuating Houston when Hurricane Ike made landfall. The control center became the prime location for space station operations. It has the capabilities to allow the team to perform the same functions as Johnson's Mission Control Center. (NASA/MSFC)

But the POIC isn't the only advanced facility behind the walls of Building 4663, also known as the Huntsville Operations Support Center (HOSC). You'll also find the "air traffic controller" of the operations center, the Data Operations Control Room, filled with a dedicated team whose primary purpose is to provide ground support. Here, a group of employees takes in science data from the space station, and distributes it to the POIC and those who have experiments on the orbiting laboratory.

Also joining these command centers is the Marshall Backup Control Center to Mission Control Center at NASA's Johnson Space Center, with capabilities to allow the flight control team to perform the same functions for the station as if they were in Houston. It became operational Aug. 7, 2008, and just a month later the backup room was put to work as powerful and destructive Hurricane Ike made landfall in Texas. This triggered evacuations and the team made its way from Johnson to Backup Control Center adjacent to the POIC -- temporarily becoming the prime location for space station operations.

*See **Payload Operations Center** on page 5*

West Virginia University Successfully Completes Level 1 of Sample Return Challenge

By Janet Sudnik & Janet Anderson

NASA awarded $5,000 to the Mountaineers, first-time competitors from the West Virginia University, Morgantown. Students on the team successfully completed Level 1 of the Sample Return Robot Challenge, a part of NASA's Centennial Challenges prize program.

"It's exciting to see such innovative approaches to solving tough technical questions," said NASA Chief Technologist David Miller as he awarded the check. "These challenges are intentionally difficult so that we can make leaps, not steps, in progressing the technology. We are proud that the Mountaineers have risen to the occasion."

"It's time to 'Hail West Virginia' for their win today as they demonstrated their Mountaineer spirit," said Deputy Associate Administrator for Space Technology Dorothy Rasco. "NASA's uses prizes to mobilize American ingenuity while advancing the space technologies that will support our missions of tomorrow."

The team plans to donate the prize money to West Virginia University to be used as seed funds in the development of a scholarship that promotes robotics education and research at the university.

Robotics teams from the United States, Canada, Mexico and Estonia competed for $1.5 million in prize money at the 2014 NASA Centennial Challenges Sample Return Robot competition June 11-14. Seventeen teams arrived to compete, 14 passed inspection and took to the challenge field on the Worcester Polytechnic Institute's (WPI) campus in Worcester, Massachusetts.

*See **Sample Return Challenge** on page 6*

SLS Testing

Continued from page 2

The scale SLS model hosts more than 200 sensors, which take data representative of the predicted SLS acoustic environments. The data collected from the tests will be used to help direct and verify the design of the rocket's sound suppression system.

Water is the main component of the sound suppression system because it helps protect the launch vehicle and its payload from damage caused by acoustical energy.

"When you're building the largest rocket in the world, you have to take everything into consideration," said Garry Lyles, SLS chief engineer. "Acoustic testing is a very critical part of that. We're using testing techniques that were highly successful during the space shuttle era, and tailoring them to SLS design specifications. It's getting us where we need to be for the rocket's first flight."

To watch a video of the test, click here.

For more information about SLS, visit here.

Davidson, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.

A 5-percent scale model, including solid rocket motors, of NASA's Space Launch System (SLS) is ignited to test how low- and high-frequency sound waves will affect the rocket on the launch pad. The data collected from the tests will be used to help direct and verify the design of the rocket's sound suppression system. (NASA/MSFC/David Olive)

Payload Operations Center *Continued from page 3*

With the full activation of the system, Johnson's station flight controllers operated alongside Marshall's payload flight controllers for almost five days, executing critical operations, including the docking of a Russian Progress resupply vehicle on Sept. 16, 2008. Since then, Johnson and Marshall teams have worked together to train and certify the Backup Control Center operational systems for each hurricane season.

"Certification of the Backup Control Room for the 2014 hurricane season was completed May 27," said Angela Marsh, chief of the Mission Operations Systems Branch in the Engineering Directorate. To certify the facility, over the last three months Marshall and Johnson upgraded systems and executed operations to test the support system. Each year during certification, Houston gives full systems control to Marshall to ensure operational connectivity. "During an emergency, it is important to have confidence that the Backup Control Center will be operational and ready to support station operations without skipping a beat," Marsh said.

Recent discussions have resulted in an agreement for SpaceX to place a rack of hardware at the HOSC to be activated should Johnson go offline. SpaceX is a commercial spacecraft company headquartered in Hawthorne, California.

"We have been asked to support SpaceX by providing a data point to route Dragon spacecraft data from California to its backup center in Cape Canaveral, Florida, if SpaceX's headquarters suffers a disastrous event such as an earthquake," said Marsh. "They've requested to use the new HOSC interface and communications systems during potential outages."

To learn more about payload operations capabilities at the center, catch this Space Station Live interview with Marsh as she takes us behind the scenes in Building 4663, or visit here.

Eagan, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.

LDSD *Continued from page 1*

supersonic decelerators can help solve this problem by using atmospheric drag to slow down heavy vehicles.

"There were six total opportunities to test the vehicle and the delay of all six opportunities was caused by weather," said Mark Adler, LDSD project manager from NASA's Jet Propulsion Laboratory. "We needed the mid-level winds between 15,000 and 60,000 feet to take the balloon away from the island. While there were a few days that were very close, none of the days had the proper wind conditions."

For more than two years, the team researched wind conditions and locations around the world that would be conducive to the test. Kauai was selected because research showed that this area had the proper wind conditions to carry the balloon away from populated areas and where it needed to go over the ocean in order to launch the test vehicle. Recent weather conditions in Kauai were unexpected and caused unacceptable wind conditions to launch the balloon.

NASA continues to look at options for a future launch window. The team is working with the Pacific Missile Range Facility and looking at weather conditions predicted for later in the month when another launch window could be possible.

"Our team has been working on this project for several years, and we have been so focused," said Ian Clark, LDSD principal investigator. "We came to Kauai to do our job and get this vehicle off the ground, but unfortunately weather didn't allow us to do this. We are very optimistic and are hoping to test the vehicle at the end of the month."

NASA's Space Technology Mission Directorate funds the LDSD mission, a cooperative effort led by JPL. NASA's Marshall Space Flight Center in manages LDSD within the Technology Demonstration Mission Program Office. NASA's Wallops Flight Facility is coordinating support with the Pacific Missile Range Facility and providing the balloon systems for the LDSD test.

For updates about LDSD and future launch opportunities, visit the LDSD webpage. Also follow the project on Twitter @NASA_Technology.

Sample Return Challenge *Continued from page 4*

NASA's Centennial Challenges program does not award funds to competitors unless the challenge objectives have been met. This assures desired results are gained before government funds are paid.

This was the third Sample Return Robot competition. Due to the difficulty and complexity of the Centennial Challenges, many are only won after teams have had several years to fine-tune their entries.

"I am thrilled to see another Level 1 success, especially from a first-year team," said Sam Ortega, program manager for the Centennial Challenges Program. "We set the bar high for NASA challenges, and we anticipate that a challenge will take several repetitions in order to develop technology capable of winning.

Teams were required to demonstrate a robot that can locate and collect samples from a wide and varied terrain, operating without human control. The objective of the challenge was to encourage innovations in autonomous navigation and robotics technologies.

The challenge was divided into two levels of competition. For a robot to complete Level 1 successfully, it had to leave a starting platform in search of a sample that was previously identified in the robot's onboard computer. The robot had to autonomously return one undamaged sample to its starting platform within a 30-minute time limit. Only teams that completed Level 1 were allowed to compete in Level 2.

Team Survey from Los Angeles completed Level 1 at the 2013 competition and was the only team to compete at Level 2 in 2014. Level 2 requires competition robots to autonomously return at least two undamaged samples, including a pre-cached sample, to its starting platform within a two-hour time limit.

NASA Chief Technologist David Miller, seated right, and Deputy Associate Administrator for Space Technology Dorothy Rasco, seated left, and Centennial Challenges Program Manager, Sam Ortega, standing second from right, joined WPI's President, Laurie Leshin, seated middle, to award a check to the University of West Virginia's team, The Mountaineers. The team's robot successfully achieved Level 1 of the Sample Return Robot Challenge.(NASA/Joel Kowsky)

Samples were categorized as easy, intermediate and hard based on the complexity of their shape, size and design, with higher point values given for samples classified as hard. Samples ranged in shape and size from rectangular (like a shoe box) or round (like a tennis ball).

The Centennial Challenges program is part of NASA's Space Technology Mission Directorate, which is innovating, developing, testing and flying hardware for use in NASA's future missions.

For more information about NASA's Centennial Challenges and the directorate, visit here.

Anderson is a public affairs officer in the Office of Strategic Analysis & Communications (OSAC). Sudnik, an ASRC Federal/Analytical Services employee, supports OSAC.

Marshall Team to 'Take Our Children to Work' June 19

NASA's Marshall Space Flight Center will hold its annual "Take Our Children to Work Day" June 19, with a variety of hands-on learning activities, demonstrations and participatory events scheduled from 8:15 a.m. to 2:30 p.m.

Children in grades 3-12 are invited to participate. Each child must be preregistered for the event.

Shuttle buses will be available to transport children and parents to activities around the center.

A complete roster of events is available online; team members are encouraged to sign up children early for activities with limited spaces. The page also includes a centerwide bus schedule, badging and access information and other details.

For more information, contact Abbie Johnson at 544-0014 or abbie.j.johnson@nasa.gov.

Marshall Small Business Events Draw Industry Leaders, Entrepreneurs

Glenn Delgado, associate administrator for NASA's Office of Small Business Programs at NASA Headquarters, was among the speakers at the Exploration Systems Development (ESD) update and NASA HUBZone Industry Day, a pair of NASA small business events organized by the Marshall Space Flight Center and held June 9-10 at the Huntsville Museum of Art. Senior managers in the Space Launch System Program Office and other ESD organizations discussed recent milestones and future plans, while the HUBZone event brought together representatives of small firms operating in historically underserved business zones and the large prime contractors and NASA organizations with whom they seek to do business. (MSFC/Fred Deaton)

Marshall Small Business Specialist David Brock, right, chats between sessions with Marshall Deputy Director Teresa Vanhooser, left, and Jackie Rybacki, NASA capture manager at ITT Exelis, a global aerospace, defense and information company headquartered in McLean, Virginia. Brock led the Marshall team responsible for planning and executing the events. (MSFC/Fred Deaton)

A highlight of the Industry Day events was the signing of a new NASA Mentor-Protégé agreement between Teledyne Brown Engineering of Huntsville and MartinFederal Consulting, a disabled-veteran-owned small business headquartered in Auburn, Alabama. Participating in the signing agreement are, seated from left, Corey Martin, president and chief executive officer of MartinFederal; Kathy Christy, Marshall Center contracting officer; and Dwight Mosby, manager of training and crew operations at Teledyne Brown; and, standing from left, Diane Sizemore, MartinFederal program control specialist; Jan Hess, president of the Engineered Systems segment of Teledyne Technologies Inc. and its subsidiary, Teledyne Brown Engineering; Debbie Batson, Teledyne Brown business development manager; Joe Eversole, Marshall procurement supervisor; David Brock, Marshall Small Business specialist; Roxanne Melton, Marshall procurement supervisor; Glenn Delgado, associate administrator for NASA's Office of Small Business Programs at NASA Headquarters; Tabisa Kalisa, manager of NASA's Office of Small Business Programs at NASA Headquarters; Teresa Vanhooser, Marshall Center deputy director; and Carmen Price, payload operations integration manager in Marshall's Mission Operations Laboratory. (MSFC/Fred Deaton)